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Thousands of low-head dams have been constructed for irrigation diversion on rivers throughout the Western United States. The vast majority have been built without fish passage consideration or facilities. These dams can represent complete or partial barriers to migrations of native fish species, including salmonids and nonsalmonids. They can fragment rivers, isolate fish populations, and restrict fish movements to spawning, nursery, feeding, and overwintering habitat. Restricted fish passage and distribution, especially at low flows, can result in limited abundance and recruitment and the endangerment of sensitive species. This study will compare fish communities upstream and downstream from selected low-head dams and assess the extent of fish passage before and after peak annual flow.

Objectives are as follows: (1) characterize fish community composition, species richness, relative abundance, and size structure of populations upstream and downstream from low-head dams in the middle and lower Yellowstone River, Montana; (2) evaluate the upstream and downstream passage of marked fish at low-head dams in the middle and lower Yellowstone River, Montana, after maximum annual discharge; (3) examine the extent of fish use of natural bypass channels at low-head dams; (4) assist development of ecologically and economically realistic fisheries management and conservation management strategies to enhance fish passage at low-head dams.

Fish species' swimming ability appeared to be related to dam passage in the Yellowstone River, but fish size was not an important variable. Results suggest that fish passage was feasible at individual dams at high flows for some species such as sauger, white sucker, goldeye, shorthead redhorse, walleye, and carp. However, the six dams in series on the Yellowstone represent a cumulative fish passage challenge that, in combination, may ultimately restrict fish distributions and limit abundance, especially during low flows in dry years. Enhancing natural bypass channels and constructing artificial riffles may be useful strategies for promoting fish passage at low-head dams.

USBR Montana Area Office; Montana Department of Fish, Wildlife and Parks; Montana State University; USFWS; Virginia Tech University

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